REMARKS

Claim status

Claims 1-70 were pending in the case at the time of the current Office Action. Claims 11-38 and 47-70 have previously been withdrawn. Claim 1 and 2 are currently amended herein. Claims 1-70 are currently pending in the application.

Section 103 rejections

In the current Office action, claims 1, 2 and 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita et al. (U.S. Patent 5,825,336), hereinafter Fujita, in view of Lipkin (U.S. Patent 5,999,944), hereinafter Lipkin.

Applicants respectfully traverse the foregoing rejection in view of the above pending claims and for reasons set forth hereafter.

To allow an easier understanding of the claim structure, various parts of claim 1, as recited below, have been numerically annotated. The numerical annotations are referred to herein in the arguments below.

Independent claim 1 recites:

A virtual reality computing apparatus, comprising:

(1) at least one signal input which is connectable to an external input unit;

(2) a first message channel;

(3) a graphics master unit

(3-1) which has a first random access memory

adapted to receive and store a first scene graphics data file,

which first scene graphics data file defines objects and/or events of a three-dimensional scene according to a code of a virtual reality modeling

language and by means of object and/or event parameter values associated with the objects and/or events, respectively,

which associate object and event parameter values respectively with the objects and/or events,

and which objects and/or event parameters are defined in the code of the virtual reality modeling language in a manner allowing a computation of partial images or of a sequence of consecutive partial images, so as to enable a three-dimensional perception of the three-dimensional scene by a human viewer by synchronously displaying the partial images as a composite image,

(3-2) is connected to the signal input,

(3-3) is connected by way of a first message interface for incoming and outgoing messages to the first message channel

(3-4) and which is adapted

(3-4-1) to re-compute and store the object and/or event parameter values of the first scene graphics data file according to the code of the virtual reality modeling language in dependence on the current object and/or event parameter values thereof and on the current state of the signal input

(3-4-2) and to produce and send a first message by way of the first

message interface, wherein the first message contains at least a part of the freshly computed object and/or event parameter values according to the code of the virtual reality modeling language; and

(4) at least two graphics client units, wherein each graphics client unit

has a respective second random access memory which is adapted to receive and store a respective second scene graphics data file, which defines objects and/or events identical to those of the first scene graphics data file in the code of the virtual reality modeling language and by means of object and/or event parameter values associated with the objects and/or events, respectively, as received from the graphics master unit with the first message,

(4-2) is connected by way of a second message interface for incoming and outgoing messages to the first message channel,

(4-3) has a respective image data output,

(4-4) and is adapted

(4-4-1) to receive the first message comprising the re-computed current object and/or event parameter values by way of the second message interface and to store the received object and/or event parameter values in the respective second scene graphics data file, thus overwriting the previously stored respective second scene graphics data file,

(4-4-2) to compute, after having overwritten the previously stored respective second scene graphics data file, respective image data of a respective partial image of the three-dimensional scene in dependence on the object and/or event parameter values of the

second scene graphics data file, such that all partial images of the three-dimensional scene computed by thc graphics clients units, when synchronously displayed together, allow a three-dimensional perception of the three-dimensional scene by a human viewer,

(4-4-3) to produce and send a second message to the graphics master unit by way of the second message interface which second message signals the conclusion of the image data computation of the respective partial image by the respective graphics client unit,

(4-4-4) and to output the respective image data of the respective partial image after having sent the second message to the graphics master unit.

The apparatus of claim 1 provides a sharing of the computation load during image calculation. Sharing the computational load is achieved by having the graphics master unit re-compute a first scene graphics data file in dependence on the current status of the first scene graphics data file and on the current state of the signal input, and transmitting a first message to the graphics client units with updated object/event parameter values that let the graphics client units update their individual second scene graphics data file for computing image data.

Neither Fujita, Lipkin, nor the combination thereof teach or suggest the claimed invention of independent claim 1. In particular, neither Fujita, Lipkin, nor the combination thereof teach or suggest a graphics master unit adapted to compute partial images and synchronously display those partial images as a composite image to enable a three-dimcnsional perception of a three-dimensional scene by a human viewer (see 3-1 of claim 1). Furthermore, neither Fujita, Lipkin, nor the combination thereof teach or suggest at least two graphics client units adapted to compute image data of partial images such that all partial images of a three-dimensional scene computed by the graphics client units allow a three-dimensional perception of the three-

dimensional scene by a human viewer when synchronously displayed together (see 4-4-2 of claim 1).

In fact, Fujita and Lipkin do not describe the computing of partial images and the synchronous displaying of those partial images as a single image at all. Instead Fujita describes a remote operation apparatus comprises a MA terminal having a video display, an operation data generator, and a parameter data generator and at least a slave terminal, coupled to the MA terminal through at least a network, including operation data receiver, a video data generator and a display, a screen parameter receiver, and a video data acquiring portion. The operation data generator generates and transmits operation data to the video data generator of the slave term to generate and display video data. The screen parameter data generator generates screen parameter data indicating required video data and quality and transmits it to a video data acquiring portion acquiring the generated video data in the required region and quality and transmits it to the display of the MA terminal.

Lipkin is concerned with a method and apparatus for implementing dynamic VRML. VRML (Virtual Reality Modeling Language) is a standard file format for representing three-dimensional interactive vector graphics. Lipkin describes that, based on the previous knowledge, there was a need for rapid and efficient (specifically, real-time) creation, modification, and updating of a virtual world, especially with a system or process that permits elements of a graphical world to be modified in real time based upon a changing source of data.

The solution provided by Lipkin is based upon the use of a data base for storing field values of a node (i.e., an object of the virtual world). VRML is designed particularly for use with the world wide web. Accordingly, the system described in Fig. 1 comprises a server and a client, which are connected over a network 18. The server 10 is described as a web server containing a VRML agent 16. The server has access to a VRML data base 20, which is accessed by a data base server comprised by web server 10 and containing the VRML agent 16 (see column 6, line 40 to column 7, line 44 of Lipkin).

Fujita and Lipkin are not concerned at all with the computation of partial images and the synchronous displaying of those partial images. Furthermore, combining the teachings of Fujita

and Lipkin would not lead to the distributed computing of image data involving a graphics master and at least two graphics clients. In fact, Lipkin seems to teach away from claim 1 of the present application.

The system of Lipkin has only one client, not "at least two clients", as does claim 1. Thus, Lipkin does not disclose a distribution of image data calculation load onto the shoulders of a plurality of clients. Instead, Lipkin describes a server-client relationship and implies that the server provides the complete parameter set, which the client needs for performing an image calculation. The calculation of the image is performed at the client alone, which client thus carries the full computational load. The server-client relationship described by Lipkin, therefore, does not involve a sharing of the computational load between a master and a plurality of clients.

Even if not directly disclosed by Lipkin, the teaching of Lipkin would not exclude that another client can be connected to the server. That would form a situation comparable to that of well-known internet use, where a web server can serve a number of clients (i.e., computers with web browsers running), using some multiple access administration scheme on the server side. However, these individual server-client relationships would all be independent from each other and not involve a sharing of a computational load. Therefore, Lipkin seems to teach away from the apparatus of claim 1.

Therefore, in view of at least the foregoing, it is respectfully submitted that independent claim 1 is not unpatentable over Fujita in view of Lipkin, and it is respectfully submitted that independent claim 1 defines allowable subject matter. Also, since claims 2 and 42-44 depend either directly or indirectly from claim 1 it is respectfully submitted that claims 2 and 42-44 define allowable subject matter as well. Applicants respectfully request that the rejection of claim 1, 2 and 42-44 under 35 U.S.C. 103(a) be removed.

Also, in the current Office action, claims 3, 4, 39, 40, 45, and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita, Lipkin, and further in view of Ishiwata et al. (U.S. Patent 5,894,312), hereinafter, Ishiwata.

Applicants respectfully traverse the foregoing rejections in view of the above pending claims and for reasons set forth hereafter.

As described previously, Fujita and Lipkin do not teach or suggest the invention of independent claim 1 and it was submitted that claim 1 defines allowable subject matter. Therefore, the use of multiple memory addressing techniques as described by Ishiwata, in combination with Fujita and Liplin does not teach or suggest the invention of claims 3 and 39 which are dependent, either directly or indirectly, on claim 1. Similarly, the use of a control section as described by Ishiwata, in combination with Fujita and Lipkin does not teach or suggest the invention of claims 4 and 40 which are dependent, either directly or indirectly, on claim 1. Also, the use of an image processing apparatus and a control section as described by Ishiwata, in combination with Fujita and Lipkin does not teach or suggest the invention of claim 45 which is dependent, either directly or indirectly, on claim 1. Finally, the use of a control section and data selectors as described by Ishiwata, in combination with Fujita and Lipkin does not teach or suggest the invention of claim 45 which is dependent, either directly or indirectly, on claim 1.

Since claims 3, 4, 39, 40, 45, and 46 depend either directly or indirectly from claim 1, it is respectfully submitted that claims 3, 4, 39, 40, 45, and 46 define allowable subject matter as well. Applicants respectfully request that the rejection of claims 3, 4, 39, 40, 45, and 46 under 35 U.S.C. 103(a) be removed.

Furthermore, in the current Office action, claims 5-10 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita, Lipkin, Ishawata, and further in view of Matsumoto et al. (U.S. Patent 5,666,544), hereinafter, Matsumoto.

Applicants respectfully traverse the foregoing rejections in view of the above pending claims and for reasons set forth hereafter.

As described previously, Fujita and Lipkin do not teach or suggest the invention of independent claim 1 and it was submitted that claim 1 defines allowable subject matter. Therefore, the use of data handshaking methods as described by Matsumoto and multiple memory addressing techniques as described by Ishiwata, in combination with Fujita and Lipkin,

does not teach or suggest the invention of claims 5 and 41 which are dependent, either directly or indirectly, on claim 1. Similarly, the combination of Fujita, Lipkin, Ishiwata, and Matsumoto does not teach or suggest the invention of claims 6-10 which are dependent, either directly or indirectly, on claim 1.

Since claims 5-10 and 41 depend either directly or indirectly from claim 1, it is respectfully submitted that claims 5-10 and 41 define allowable subject matter as well. Applicants respectfully request that the rejection of claims 5-10 and 41 U.S.C. 103(a) be removed.

Accordingly, the applicant respectfully requests reconsideration of the rejections and objections based on at least the foregoing. After such reconsideration, it is urged that allowance of claims 1-10 and 39-46 will be in order.

Respectfully submitted,

Date: June 8, 2007

David J. Muzilla
Registration No. 50,914

Hahn Loeser & Parks LLP
One GOJO Plaza, Suite 300
Akron, OH 44311-1076
(330) 864-5550
Fax 330-864-7986
djmuzilla@hahnlaw.com

CUSTOMER No. 021324